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NOTES ON *GRAPTOPHYLLUM* NEES (ACANTHACEAE) IN AUSTRALIA

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Summary

A revised key to the species of *Graptophyllum* in Australia is given. The most important diagnostic characters for *Graptophyllum* in Australia are discussed. *Graptophyllum reticulatum* A. Bean & Sharpe sp. nov. from south-east Queensland is described. *G. thorogoodii* C. White is reduced to synonomy with *G. excelsum* (F. Muell.) Druce.

Introduction

A revision of the family Acanthaceae in Australia, including a review of the genus *Graptophyllum*, was published by R.M. Barker in 1986. In revising the genus, Barker was hampered by the few specimens available for study, some of which were sterile. This problem has now been partly remedied, as numerous collections have been made recently. This increase in herbarium material combined with field observations by the authors and others, allows us to clearly define the most important characters and circumscribe the species involved. The discussion below applies to Australian *Graptophyllum* material only.

Diagnostic Characters

Leaf characters

(a) *Arrangement*: For most species, a simple pattern of opposite leaves is the rule, but for one species, *G. excelsum*, condensed axillary branchlets occur, in addition to the normal phyllotaxis. Here several leaves are formed on very short side-branches and separated by very short internodes. This gives the appearance of a cluster of leaves at each node.

(b) *Size and shape*: Leaf shape, and to a lesser extent leaf size, are relatively consistent for each species. There is some overlap between species, but used in conjunction with other characters, leaf size and shape are useful diagnostic characters in species determination. The prominence or otherwise of marginal teeth is diagnostic. In *G. excelsum*, leaves are entire or slightly toothed, *G. spinigerum* is distinctly toothed, while the remaining species have long spinose marginal teeth. In fresh material of most species, the lateral veins are not readily visible, but *G. reticulatum* has prominent raised reticulation of leaf veins. *G. ilicifolium* displays this feature in dried material.

(c) *Pairs*: A feature of most *Graptophyllum* species is that the leaves at each node are unequal in size. In those species, the larger leaf is commonly more than five times the area of the smaller one. In *G. excelsum*, the one species which does not display this feature, the leaf pairs are about the same size.

Axillary spines

From field observations of all four species, we have found that axillary spines are consistently either present or absent for wild populations of each species. However, in the case of species where spines occur, they will not necessarily be evident on herbarium specimens. The axillary spines occur most often on older wood or coppice growth. Young, actively growing stems may be free from spines, hence cultivated plants seldom possess them. *G. reticulatum* never has axillary spines.

Flowers

Two species, *G. excelsum* and *G. ilicifolium*, have large (c. 30 mm long) red flowers, while *G. spinigerum* and *G. reticulatum* have small (c. 10 mm long) white flowers with mauve spots. The size and colour of flowers is consistent for each species. We can find

no evidence of the floral dimorphism which Barker (1986: 158) suggested could occur in *Graptophyllum*. Smaller "flowers" observable on specimens of the large-flowered species appear to be flower buds, in which the corolla has split prematurely in response to the drying of the specimen.

The number of flowers per leaf axil, length of calyx segments, and pedicel length were all found to be highly variable. Fruits are too rarely seen, either in the field or the herbarium, to be used for diagnostic purposes.

Key to the Australian species of *Graptophyllum*

1. Leaves 6–10 cm long, with spinose marginal teeth >2 mm long; reticulation of leaf venation raised in dried material 2
   Leaves 1.7–6 cm long, entire or with short marginal teeth <2 mm long; leaf venation obscure on dried material 3

2. Corolla white with mauve spots, 8–11 mm long; leaves 3–4.5 cm wide, lateral veins raised in fresh material . . . . . **G. reticulatum**
   Corolla red, >25 mm long; leaves 3.5–5.5 cm wide, lateral veins not raised in fresh material . . . . . **G. ilicifolium**

3. Leaf pairs approximately equal in size, margins entire or slightly toothed; corolla red, >25 mm long; condensed axillary branchlets present **G. excelsum**
   Leaf pairs greatly unequal in size, margins distinctly toothed; corolla white with mauve spots, 7–10 mm long; condensed axillary branchlets absent . . . . . **G. spinigerum**

Taxonomic Treatment

Graptophyllum reticulatum A. Bean & Sharpe **sp. nov.** affinis *G. spinigero* a qua floribus extus glabris, ramulis glabris, foliis aculeatidentatis valde retinervis, spinis axillaribus nullis differt. **Typus:** Queensland. MORETON DISTRICT: about 7 km SW of Nambour, 7 October 1989, *P.R. Sharpe* 4889 & *A.R. Bean* (holo: BRI; iso: AD,CANB,K,L,MEL,NSW).

A shrub, 1–2.5 m high, bark smooth, grey. Branchlets angular, glabrous, bark loose, axillary spines absent. Aerial roots sometimes present. Leaves opposite, leaf pairs markedly unequal in size. Larger leaves up to 10.5 × 4.5 cm, dark green above, paler below, glabrous, leathery, with 5–8 pairs of pungent marginal teeth; apex acute, spine-tipped; midrib impressed above; reticulation raised and very conspicuous on upper surface, main veins visible on lower surface; cystoliths very numerous, conspicuous; petioles about 2 mm long. Inflorescences small, dense axillary cymose clusters of 5–18 flowers on very short peduncles, each flower subtended by a pair of 2 mm long eglandular hairy bracteoles, at the base of the pedicel. Calyx segments 4–8 mm long, slender, glabrous outside, hairy inside. Pedicels 3–7 mm long. Corolla 8–11 mm long, white with mauve spots in the throat; externally glabrous, and internally glabrous apart from indumentum at point of filament insertion, and at apex of upper lip; limb 2-lipped, upper lip notched, convex, lower lip divided into 3 nearly equal lobes, recurved. Stamens two, brown, exserted; filaments hairy on lower half, anthers two-celled, brown, slender, parallel, glabrous, opening by slits, connective not extended; staminodes two, enclosed. Style with a few sparse hairs; stigma distinctly 2-lobed. Fruit a woody capsule, clavate, apically acute, 15–17 × 4 mm. Seeds not seen. **Fig 1.**

Specimens examined: Queensland. MORETON DISTRICT: near Dulong Road, west of Woombye, May 1989, *Bean* 1034 (BRI); ditto, Nov 1989, *Bean* 1192 (BRI,NSW); Brolga Park, west of Woombye, Feb 1990, *Bean* 1348 (BRI).

Distribution and habitat: This species is known from just two small populations about 1.5 km apart. About 100 plants occur at each site, growing in complex notophyll vine forest. Habitat varies from creekbank to hillside but in all cases, the ground is very rocky. Associated species include *Syzygium francisii* (Bailey) L. Johnson, *Hodgkinsonia ovatiflora* F. Muell., *Cryptocarya laevigata* Blume, *Bouchardatia neurococca* (F. Muell.) Baillon and *Dissiliaria baloghioides* F. Muell. ex Benth.

Flowering period: October – December.

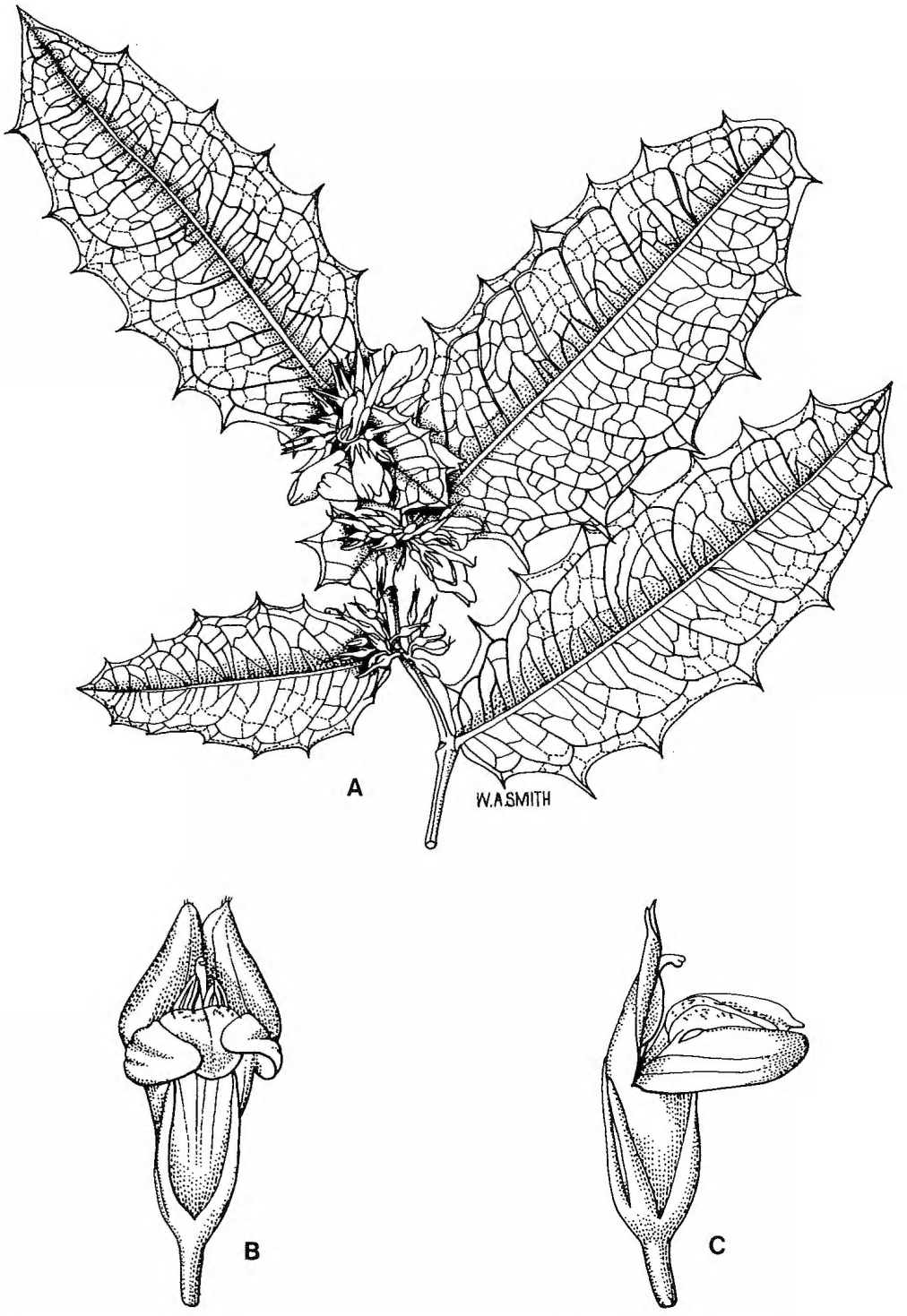

Fig. 1. *Graptophyllum reticulatum*: A. part of flowering twig × 1. B. flower from front × 4. C. flower from side × 4.

Affinities: *G. reticulatum* is readily distinguishable from all other species of *Graptophyllum.*

(i) *G. excelsum* has large red flowers, leaves less than 4 cm long, leaf pairs which are approximately equal in size, and condensed axillary branchlets. None of these features is possessed by *G. reticulatum.*

(ii) *G. spinigerum* has the same size and colour flowers, but it has hairs on its branchlets, corolla (externally), calyx (externally), and anthers; while *G. reticulatum* does not. The leaves of *G. spinigerum* are smaller, and lack spinose teeth and raised leaf venation.

(iii) *G. ilicifolium* is vegetatively similar to *G. reticulatum*, but can be distinguished by its broader leaves, somewhat shorter marginal teeth and less conspicuous reticulate venation. The flowers of *G. ilicifolium* are red, and about 30 mm long.

G. ilicifolium, *G. spinigerum* and *G. excelsum* possess axillary spines, whereas *G. reticulatum* does not.

Conservation status: Being restricted to an area of about two hectares, *G. reticulatum* must be considered endangered, 2E, following the criteria used by Thomas and McDonald (1989).

Etymology: The specific epithet refers to the prominent reticulation of the leaf venation.

Graptophyllum ilicifolium (F. Muell.) F. Muell. ex Benth., Fl. austral. 4: 552 (1868); *Graptophyllum earlii* var. *ilicifolium* F. Muell., Fragm. 6: 87 (1867). **Type:** Port Mackay, Mount Blackwood, s. dat., *Nernst* (lecto: MEL), *fide* R.M. Barker, J. Adelaide Bot. Gard. 9: 163 (1986).

This species occurs as a tall shrub which grows on rocky gullies in complex notophyll vine forest in the Mackay district, where it is probably endemic. It is characterised by large red flowers (30–35 mm long) and large leaves (6–11 cm long and 4–5.5 cm wide) which possess long spinose marginal teeth. The leaf pairs are greatly unequal in size. Branchlets are glabrous. Axillary spines are present, but rarely seen on herbarium material. Condensed axillary branchlets are absent.

Specimens examined: Queensland. SOUTH KENNEDY DISTRICT: Mackay, S. dat. *Nugent* 64 s. dat. [AQ 006883] (BRI); Revenge Creek, on SW side of Mt Adder 12–15 km from Kuttabul, Jul 1984, *Champion* 71 & *Champion* (AD,BRI,CANB,NSW).

A specimen collected by Jones (BRI, AQ 007238) from Port Douglas and determined by Barker (1986) as either *G. spinigerum* or *G. ilicifolium*, is clearly *G. spinigerum* based on the small flowers and shallowly toothed leaves which lack raised reticulation.

Graptophyllum excelsum (F. Muell.) Druce, Bot. Soc. Exch. Club Brit. Isles, Rep. 1916: 625 (1917); *Earlia excelsa* F. Muell., Fragm. 3: 160 (1863); *Graptophyllum earlii* F. Muell., Fragm. 6: 87 (1867), nom. illeg.; *Thyrsacanthus earlii* F. Muell., Fragm. 6: 87 (1867), nom. inval. **Type:** Rockhampton, *Thozet* 75 (lecto: MEL), *fide* R.M. Barker, J. Adelaide Bot. Gard. 9: 161 (1986).

Graptophyllum thorogoodii C. White, Proc. Roy. Soc. Queensland 50: 83 (1939), **synon. nov. Type:** Kelsey Ck, near Proserpine, March 1937, *Thorogood* (holo: BRI).

G. excelsum is characterised by consistently large red flowers (about 30 mm long), small leaves (varying from 1.7 to 4 cm long), leaf margins entire or slightly toothed and leaf pairs of approximately equal size. Leaves may be completely glabrous (e.g. *Vavryn* 22, BRI) or slightly pubescent at base of midrib (e.g. *Hoy* 138, BRI). Condensed axillary branchlets are present and are usually evident on herbarium material. Axillary spines are present, but these are not always evident on herbarium specimens. For example, *Forster* 5120 & *Vavryn* consists of 2 sheets collected from the same plant. In material on one sheet, axillary spines are present, whereas in that on the other sheet, there are none. *G. excelsum* inhabits semi-evergreen vine thicket.

G. thorogoodii was described by White (1939) from a specimen collected at Kelsey Creek near Proserpine. In recent years, populations occurring in the Chillagoe area have also been ascribed to this species (Barker 1986). White, in his protologue, compared *G. thorogoodii* with *G. spinigerum*, and discussed the possibility that *G. thorogoodii* may "in the future be regarded as a variety or synonym" of that species, because of his supposition that *G. spinigerum* would be found to possess dimorphic flowers. We now

know that this is not the case, and that these two taxa are quite distinct. White did not compare *G. excelsum* with *G. thorogoodii*, nor even mention *G. excelsum*.

The type collection of *G. thorogoodii* comprises four separate pieces, and it has all the characteristics of *G. excelsum* listed above. One piece displays condensed axillary branchlets, and one piece has axillary spines. The calyces (7–8 mm) and pedicels (6–9 mm) of the type are longer than is usual for *G. excelsum* but we have found calyx and pedicel length to be among the most variable characters for *Graptophyllum*. Both calyx and pedicel appear to lengthen after flowering, as mentioned by Barker (1986, 157). The Chillagoe populations assigned to *G. thorogoodii* also possess the characteristics of *G. excelsum*, although they are more inclined to possess axillary spines.

To summarise, *G. thorogoodii*, either from the type locality near Proserpine, or Chillagoe, is indistinguishable from *G. excelsum* and hence they should be considered conspecific.

Recent collections (all BRI) not cited by Barker (l.c.): **Queensland.** COOK DISTRICT: 1.5 km past Mungana trucking yards, 17°06′S, 144°23′E, Mar 1988, *Forster* 3956; Royal Archway Cave, Mungana, 17°06′S, 144°24′E, Mar 1990, *Forster* 6528. PORT CURTIS DISTRICT: Mt Etna, 23°09′S, 150°27′E, Nov 1987, *Vavryn* 22; ditto, Jun 1989, *Forster* 5120 & *Vavryn*; Mt Archer road, 23°21′S, 150°35′E, Jul 1987, *Hoy* 138; 2 km SE of Butlerville, northern end of Mt Larcom range, 23°46′S, 151°04′E, Jan 1988, *Forster* 3470 & *Gibson*.

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